

OCT 1 1965

# Guide for.....

INTRODUCTION

## AVIATION MEDICAL EXAMINERS



SEPTEMBER 1964

Office of Aviation Medicine  
FEDERAL AVIATION AGENCY  
WASHINGTON, D.C.

## Appendix D

### APPROVED TESTING EQUIPMENT

#### *Distant Vision:*

Snellen 20 ft. eye chart

##### Acceptable substitutes:

Projector with screen  
Keystone Orthoscope  
Bausch & Lomb Orthorator  
AOC Site-Screener  
Titmus Optical Vision Tester

#### *Near Vision:*

FAA Form 2917

##### Acceptable substitutes:

Jaeger near vision test card  
Snellen near vision test card  
Keystone Orthoscope  
AOC Site-Screener  
Bausch & Lomb Orthorator  
Titmus Optical Vision Tester

#### *Color Vision:*

Pseudoisochromatic plates. (Dvorine, 2d edition; AOC, revised edition or AOC-HRR; Ishihara, 16-, 24-, or 38-plate editions.)

##### Acceptable substitutes:

Farnsworth Lantern  
SAMCTT (School of Aviation  
Medicine Color Threshold  
Tester)  
Eldridge-Green Color Perception  
Lantern  
Titmus Optical Vision Tester

#### *Field of Vision:*

50-inch square black matte surface wall target with center white fixation point.

2 mm. white test object on black-handled holder.

Acceptable substitute: Standard perimeter

#### *Heterophoria:*

Horizontal prism bar with graduated prisms beginning with 1 diopter and increasing in power to at least 8 diopters.  
Red Maddox rod with handle.

½ cm. light source at a distance of at least 10 feet.

##### Acceptable substitutes:

Maddox rod and Risley rotary prism  
Maddox rod and individual prisms  
Keystone orthoscope.  
Bausch & Lomb Orthorator  
AOC Site-Screener  
Titmus Optical Vision Tester

In addition to the above equipment the examiner will be expected to have (1) an ophthalmoscope, (2) a typewriter, (3) scales, and (4) other equipment ordinarily required for the conduct of general medical examinations.

Examiners authorized to examine airline transport pilots are required to have electrocardiographic equipment or to provide alternative means for electrocardiographic examinations convenient for Class I applicants.

## Appendix E

### EXAMINATION PROCEDURES

#### EYE

##### COLOR VISION TESTS

- a. Color vision will be tested by an approved pseudoisochromatic plate or lantern (Farnsworth, SAMCTT, or Edridge-Green test.)
- b. The following conditions should be provided when testing with pseudoisochromatic plates:
  - (1) Test book at 30 inches from applicant.
  - (2) Illumination of plates by at least 20 foot-candles. (If artificial light is used it should be "daylight," fluorescent, or 100-watt blue daylight bulb.)
  - (3) Three seconds for examinee to interpret and respond to a given plate.
- c. The plates to be demonstrated for each of the approved pseudoisochromatic tests are:
  - (1) American Optical Co. (revised edition), 18 plates.
  - (2) Dvorine (second edition), 15 plates.
  - (3) Ishihara (16-plate edition), plates 1 to 8.
  - (4) Ishihara (24-plate edition), plates 1 to 15.
  - (5) Ishihara (38-plate edition), plates 1 to 21.
  - (6) AOC-HRR (second edition), screening plates 1 to 6. If any error, show plates 12 to 14.
- d. Testing procedures for the Farnsworth and SAMCTT lanterns accompany the instruments.
- e. Record test used and result (pass or fail).

##### DISTANT VISION TESTING

- a. Each eye will be tested separately with standard Snellen charts, satisfactory pro-

jector with screen or acceptable substitute devices.

- b. The Snellen chart should be illuminated by a 100-watt incandescent lamp placed 4 feet in front of and slightly above the chart.
- c. The chart or screen is placed 20 feet from the eyes of the examinee and the 20/20 line is placed 5 feet 4 inches above the floor.
- d. A metal, translucent plastic, or cardboard occluder should be used to cover the eye not being examined.
- e. The examining room should be darkened with the exception of the illuminated chart or screen.
- f. If corrective glasses are worn, the uncorrected acuity should be determined first, followed by a determination of acuity with glasses in place.

##### Common errors:

- (1) Failure to shield the examinee's eyes from extraneous light.
- (2) Permitting the examinee to view the chart with both eyes.
- (3) Failure to observe the examinee's face to detect squinting.
- (4) Incorrect sizing of the projected chart letters for a 20-foot distance.
- (5) Failure to focus the projector sharply.
- (6) Failure to obtain the corrected acuity when the examinee wears glasses.
- (7) Failure to note and to require the removal of contact lenses.

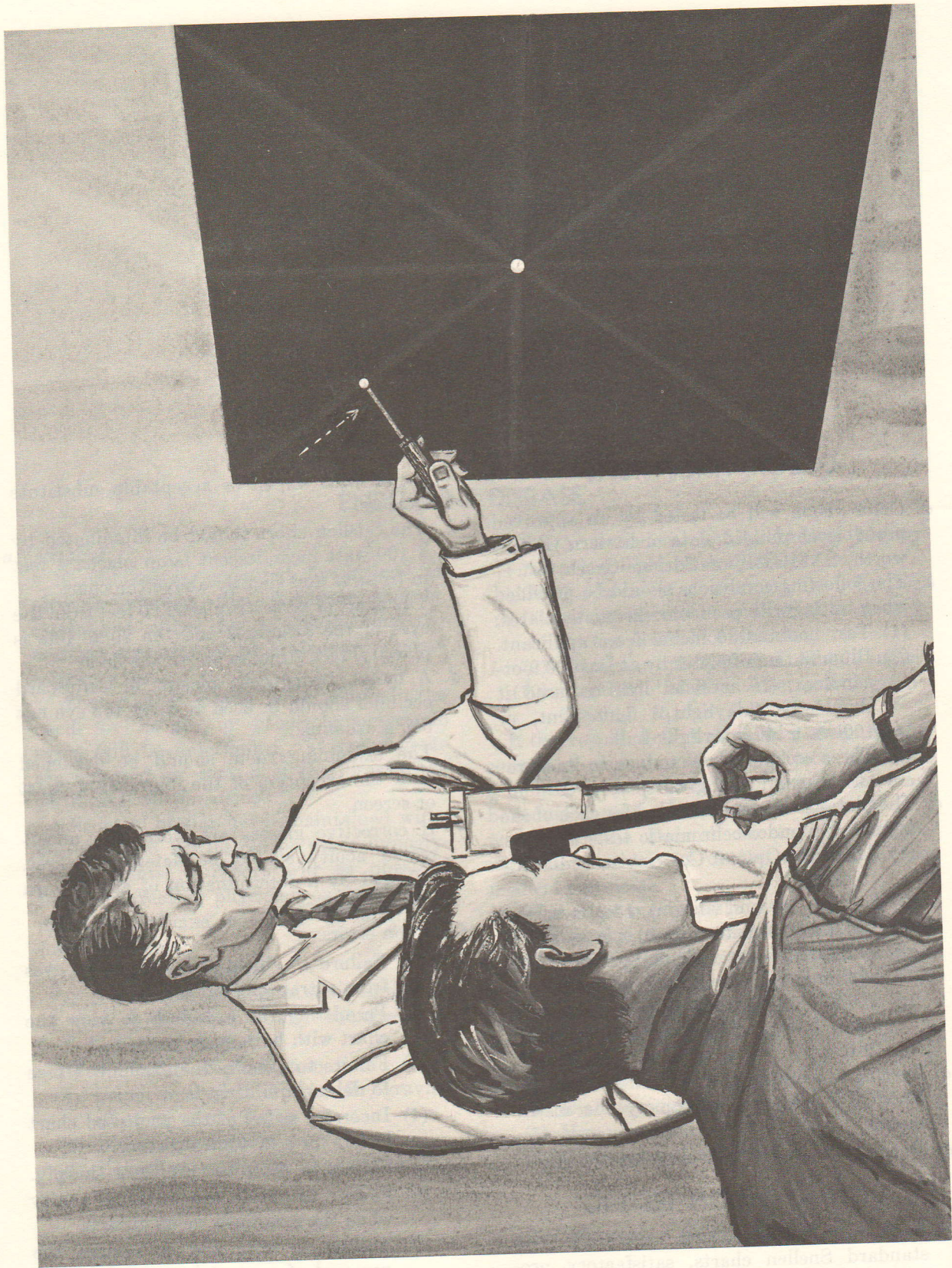


Illustration by [unreadable] for [unreadable] magazine

Directions furnished by the manufacturer or distributor will be followed when using substitute devices for the above testing.

## FIELD OF VISION TEST

### a. *Equipment:*

- (1) Testing room with 50-inch-square wall space.
- (2) Chair.
- (3) 50-inch-square wall target with a black matte surface and a white central fixation point.
- (4) 2-mm. white test object at the end of a black holder.

### b. *Testing procedure:*

- (1) Examinee will be seated 40 inches from the target.
- (2) Place an occluder over the right eye.
- (3) Instruct examinee to keep left eye focused on fixation point.
- (4) Move the white test object from the outside border of the wall target toward the point of fixation on each of the eight 45° radials. (See illustration, fig. 1, p. 54.)
- (5) The result will be recorded as the number of inches from the fixation point to the point at which the white target is first identified by the examinee.
- (6) Repeat the test with the left eye occluded and the right eye focusing on the fixation point.

### c. *Results:*

If the examinee fails to identify the target in any presentation at a distance of at least 23 inches from the fixation point, evaluation by a qualified ophthalmologist should be requested.

### d. *Alternative procedure:*

A standard perimeter may be used in place of the above procedure. With this method, any significant deviation from normal field configuration will require evaluation by a qualified ophthalmologist.

## HETEROPHORIA TESTING

### a. *Equipment:*

- (1) Testing room 10 to 20 feet in length, dimly illuminated and free of all point

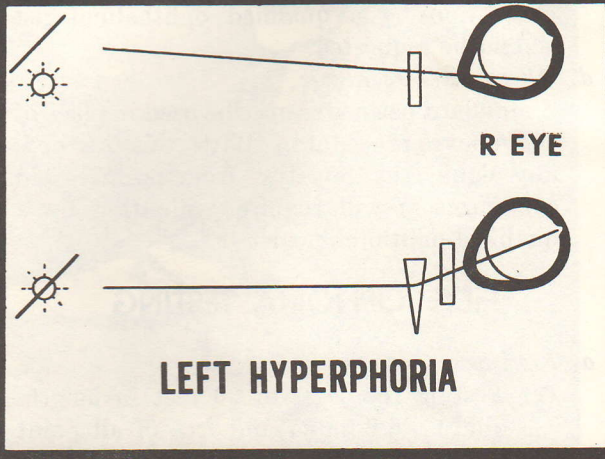
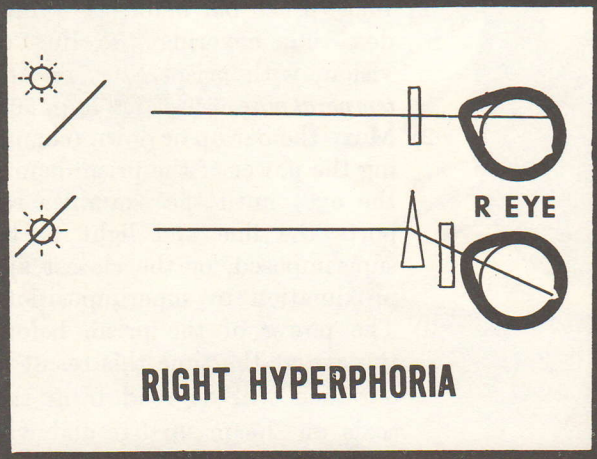
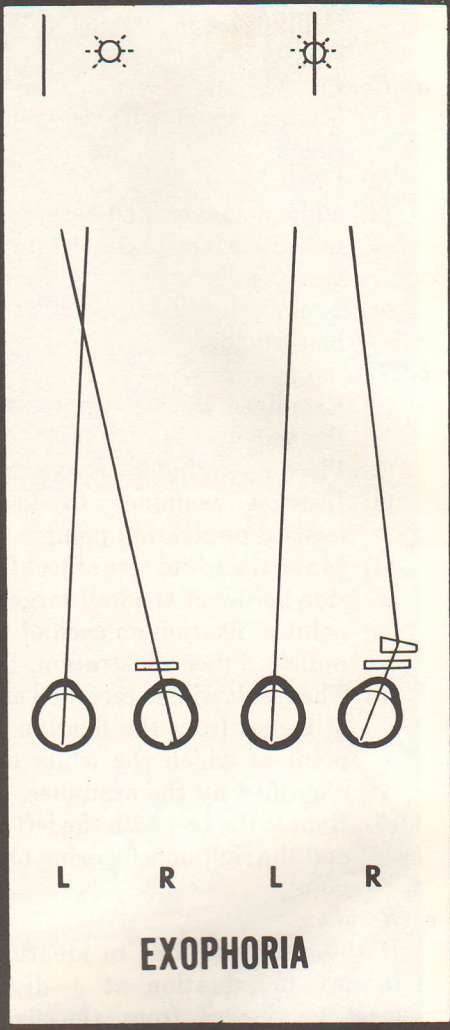
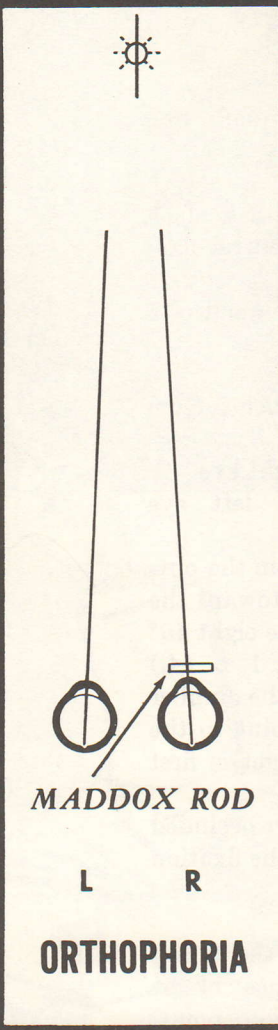
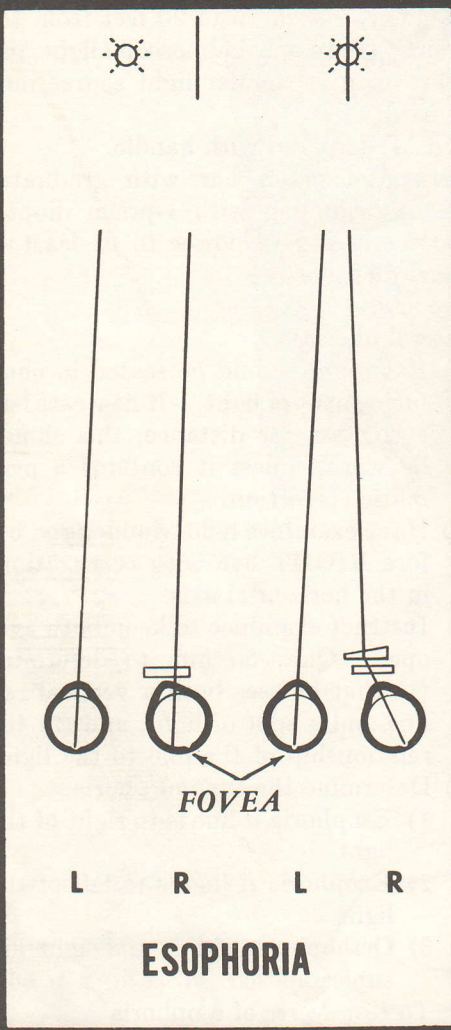
sources of light except that used for testing.

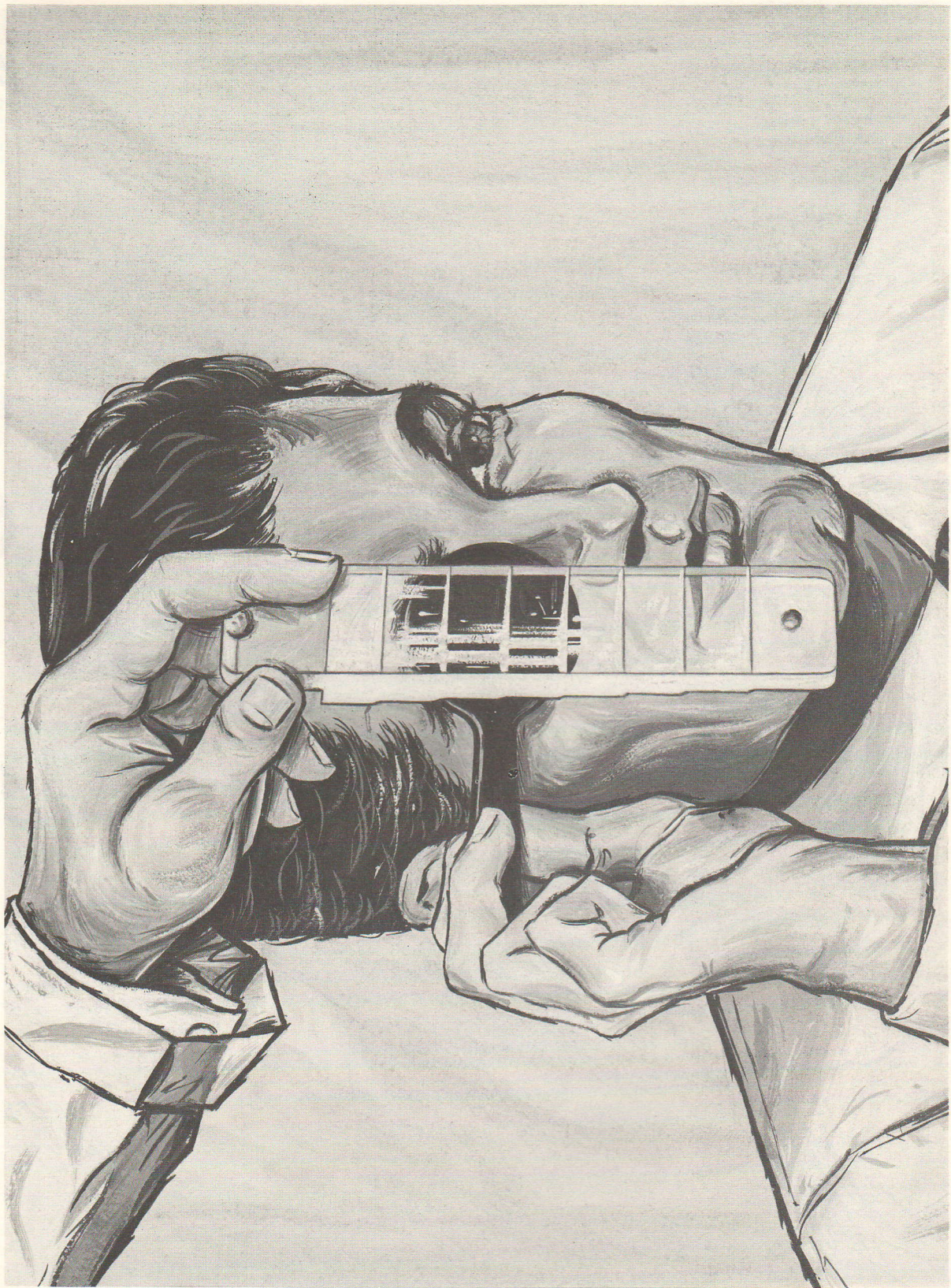
- (2) Chair.
- (3) Spot of light approximately  $\frac{1}{2}$  cm. in diameter, placed 10 to 20 feet from the chair. (Bare ophthalmoscope light, pen light, or other similar light source may be used.)
- (4) Red Maddox rod with handle.
- (5) Horizontal prism bar with graduated prisms beginning with 1-prism diopter and increasing in power to at least 8-prism diopters.

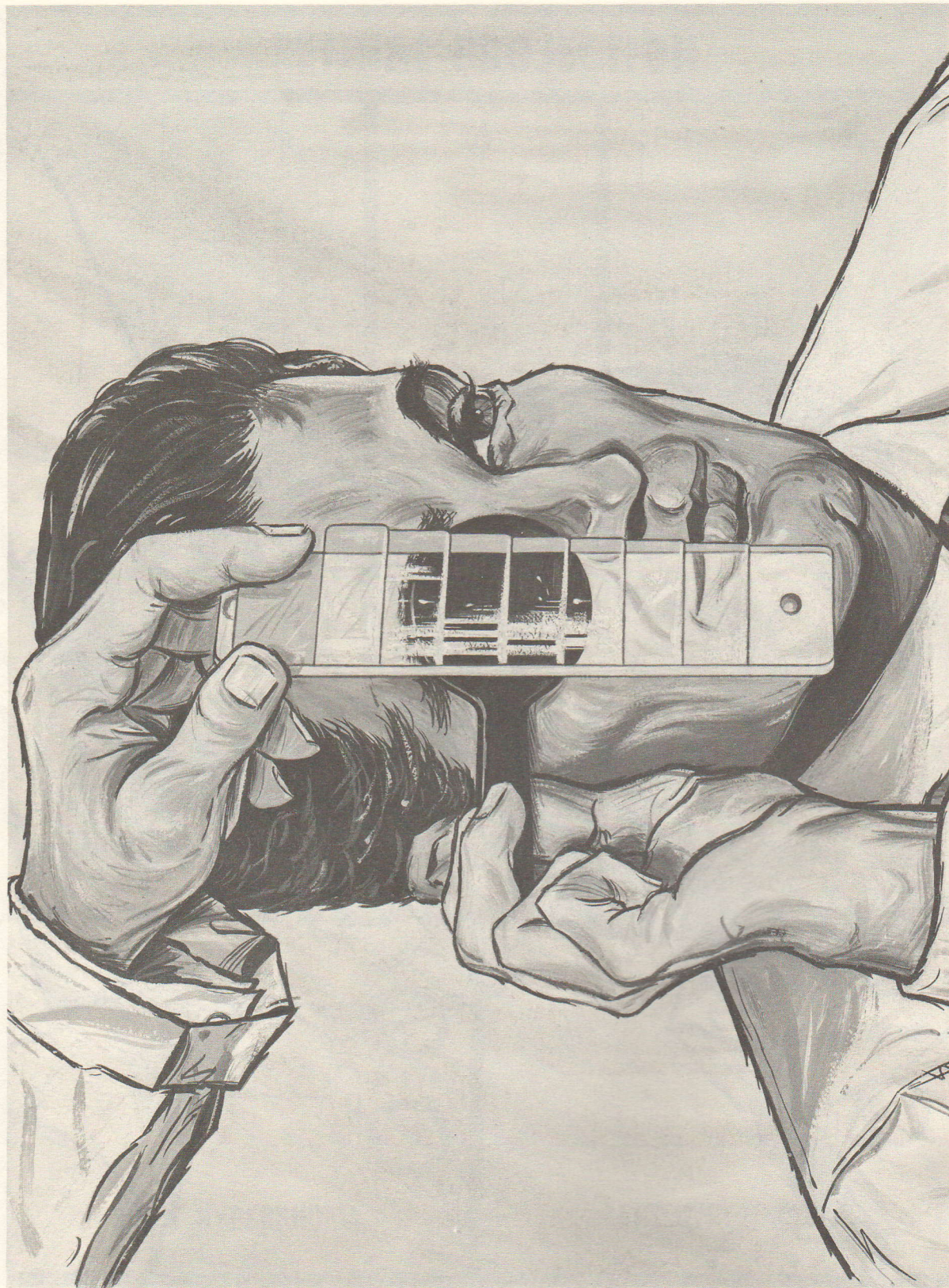
### b. *Test procedure:*

- (1) Lateral phoria:
  - (a) Examinee should be seated in chair facing spot of light. If he wears lens correction for distance, this should be worn, unless it contains a prismatic correction.
  - (b) Have examinee hold Maddox rod before RIGHT eye with corrugations in the horizontal axis.
  - (c) Instruct examinee to keep both eyes open. Question him to determine (1) that he sees both a vertical red line and a spot of light, and (2) the relationship of the line to the light.
  - (d) Determine the type of phoria:
    - 1) Esophoria if line is to right of the light.
    - 2) Exophoria if line is to left of the light.
    - 3) Orthophoria if line and light are superimposed. (See fig. 2, p. 56.)
  - (e) To test *degree* of esophoria:
    - 1) Place prism bar before the Maddox rod, covering the line of vision, with prism *bases* on the *temporal* side. (See fig. 3, p. 56.)
    - 2) Move the bar up or down (changing the power of the prism before the eye) until the examinee reports the line and light to be superimposed, or the closest approximation to superimposition.
    - 3) The power of the prism before the eye at the time this result is obtained will be read from the scale on the prism bar and will

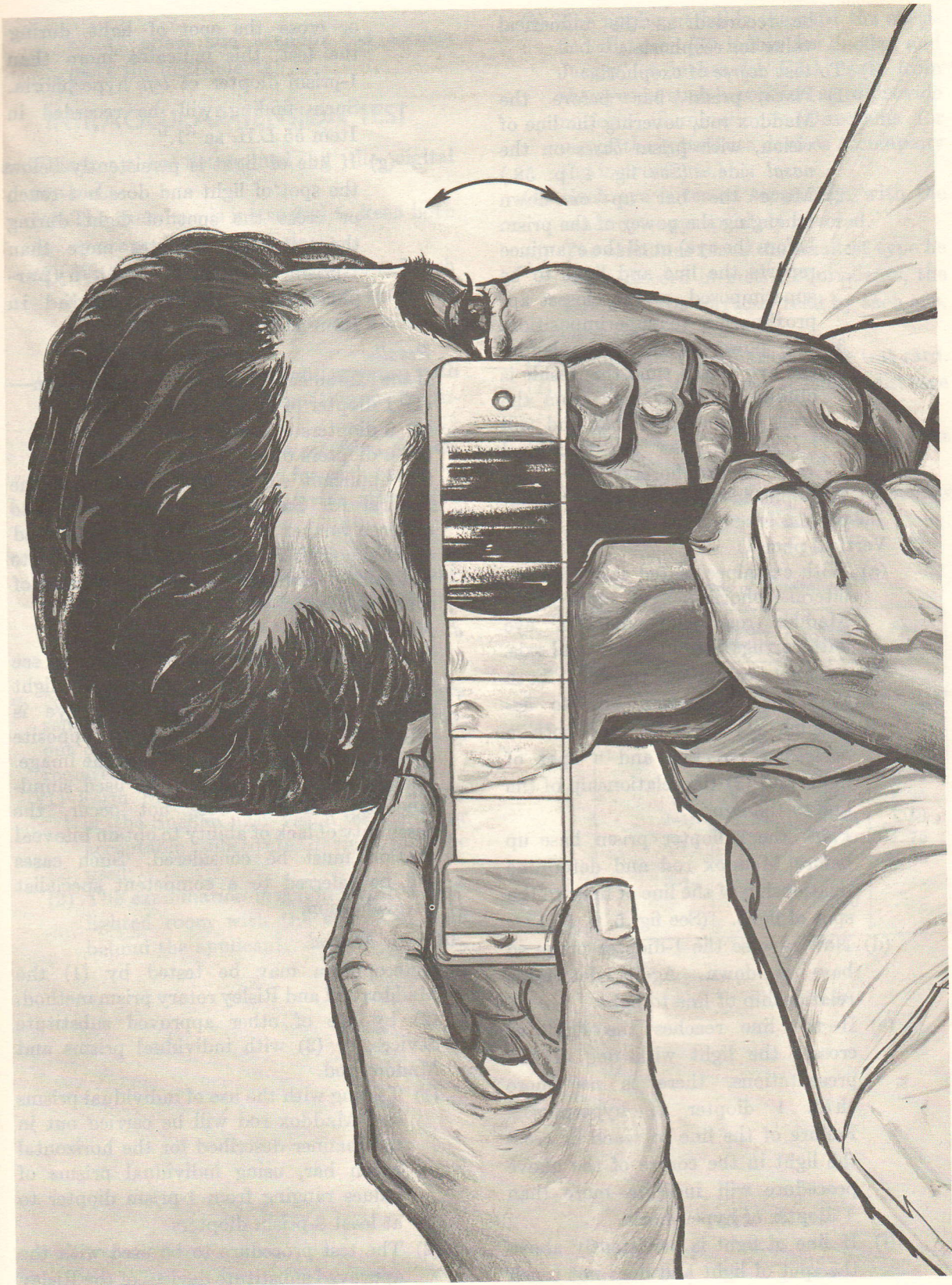
# RETINAL PROJECTION











be recorded as the numerical value for esophoria.

(f) To test *degree* of exophoria:

- 1) Place prism bar before the Maddox rod, covering the line of vision, with prism *bases* on the *nasal* side. (See fig. 4, p. 58.)
- 2) Move the bar up or down (changing the power of the prism before the eye) until the examinee reports the line and light to be superimposed, or the closest approximation to superimposition.
- 3) The power of the prism before the eye at the time this result is obtained will be read from the scale on the prism bar and will be recorded as the numerical value for exophoria.

(g) Orthophoria will be recorded "orthophoria."

(2) Vertical phoria:

- (a) With examinee seated as for testing lateral phoria, have him hold Maddox rod before **RIGHT** eye with corrugations in the *vertical* axis.
- (b) Instruct examinee to keep both eyes open. Question him to determine (1) that he sees both a *horizontal* red line and a spot of light, and (2) the relationship of the line to the light.
- (c) Place the 1-diopter prism base up before Maddox rod and determine relationship of the line of light to the spot of light. (See fig. 5, p. 59.)
- (d) Now reverse the 1-diopter prism so base is down. Again determine relationship of line to light.
- (e) If the line reaches the light or crosses the light with one of the presentations, there is *not* more than 1 diopter of hyperphoria. Failure of the line to reach or cross the light in the course of the above procedure will indicate more than 1 diopter of hyperphoria.
- (f) If line of light is persistently above the spot of light and does not touch

or cross the spot of light during the test, this indicates more than 1-prism diopter of *left* hyperphoria. Such finding will be recorded in Item 55 L.H. as "1."

- (g) If line of light is persistently below the spot of light and does not touch or cross the spot of light during the test, this indicates more than 1-prism diopter of *right* hyperphoria and will be recorded in Item 55 R.H. as "1."

c. *Results:*

If the examinee is found to have more than—

- (1) 1 diopter of hyperphoria
- (2) 6 diopters of esophoria
- (3) 6 diopters of exophoria

the applicant should be advised that the Federal Air Surgeon may require him to undergo further examination by a qualified ophthalmologist. The medical certificate will not be withheld pending the results of such examination.

d. *Note:*

If suppression is encountered (failure to see both the line of light and spot of light simultaneously), determine which eye is suppressing and briefly occlude the opposite eye until the suppressing eye sees the image. Usually both eyes will then be used simultaneously. If this does not occur, the possibility of lack of ability to obtain bifoveal fixation must be considered. Such cases will be referred to a competent specialist for evaluation.

*Alternate Method*

a. Heterophoria may be tested by (1) the Maddox rod and Risley rotary prism method, (2) by use of other approved substitute devices, or (3) with individual prisms and Maddox rod.

- (1) Testing with the use of individual prisms and Maddox rod will be carried out in the manner described for the horizontal prism bar, using individual prisms of values ranging from 1-prism diopter to at least 8-prism diopters.
- (2) The test procedure to be used with the approved substitute devices of the Risley

rotary prism and Maddox rod accompany the instruments.

### INTRAOCULAR TENSION TEST

- a. This may be determined by the digital method.
- (1) The examinee is instructed to keep both eyes open and to look down.
  - (2) With the middle and ring fingers of each hand placed on the examinee's brow, the examiner places the tips of his index fingers on the eye lid.
  - (3) The examiner exerts light pressure with each finger in turn, estimating the fluctuation of the globe.
  - (4) Ocular tension will be recorded as normal, increased, or low for each eye.
- b. A tonometer may be used as an alternative to finger testing.
- c. If other than normal tension is found, a consultation report from a qualified ophthalmologist will be appended to the report.

### NEAR VISION TESTING

- a. Near visual acuity is determined for each eye separately and recorded both with and without correcting lenses, if glasses are worn or required.
- (1) Form FAA-2917 Test Card, the Jaeger or the Snellen near vision test cards, or acceptable substitute devices may be used.
  - (2) The examination is conducted in a well-lighted room with the source of light behind the applicant.

- (3) The applicant holds the card the specified distance (20 inches for Snellen and Jaeger, 18 inches for FAA card) from the eyes in such a position as to provide uniform illumination. (Directions for use of the substitute devices accompany the instruments.)
  - (4) Each eye is tested separately, with the other eye appropriately covered.
  - (5) The examinee reads the smallest type he can. Record in metric equivalents, the smallest type correctly read by each eye.
- b. *Common errors:*
- (1) Inadequate illumination of the test card.
  - (2) Failure to hold card specified distance from the eye.
  - (3) Failure of the examiner to assure that the untested eye is covered.
  - (4) Failure to determine corrected acuity when the examinee wears glasses.

Table of Equivalents

Jaeger	Snellen Metric	Snellen English	FAA
	0.37	20/15	-----
J-1	.50	20/20	.50
J-2	.62	20/25	-----
J-4	.75	20/30	.75
J-6	1.00	20/40	1.00
J-8	1.25	20/50	1.25
J-10	1.50	20/60	1.50
J-12	1.75	20/70	1.75
			2.00
J-14	2.25	20/100	-----
		20/200	-----